

VEXATORELLA ROURKE, A NEW GENUS OF THE PROTEACEAE FROM SOUTHERN AFRICA

J. P. ROURKE

(Compton Herbarium, Kirstenbosch, Private Bag X7, Claremont 7735, R.S.A.)

ABSTRACT

Vexatorella, a shrubby genus of the Proteaceae subtribe Proteinae from montane fynbos and arid fynbos habitats in the winter rainfall region of the central south western Cape and Namaqualand, is newly described. Four species are recognised, *V. alpina*, *V. amoena* and *V. obtusata* (previously classified under *Leucospermum*) and a newly described species, *V. latebrosa*. *Vexatorella* is distinguished from *Leucospermum*, mainly by having terminal inflorescences; either as a terminal panicle of 2 to 6 pedunculate centrifugally opening capitula, or a solitary terminal pedunculate capitulum. (*Leucospermum* has axillary capitula). The genus is allied to *Leucospermum* but parallels *Leucadendron* in that the floral bracts become enlarged and lignified in the post-pollination phase. The flowers are white or pink, sweetly scented and believed to be insect pollinated.

UITTREKSEL

VEXATORELLA ROURKE, 'N NUWE PROTEACEAE GENUS VANAF SUIDER-AFRIKA

Vexatorella is 'n struikagtige genus van die Proteaceae subtribus Proteinae van die bergfynbos- en droë fynbos-habitatte in die winterreënvalgebied van sentraal Suidwes-Kaap en Namakwaland en word nuut beskryf. Vier spesies word erken, *V. alpina*, *V. amoena* en *V. obtusata* (voorheen geklassifiseer as *Leucospermum*) en 'n nuut beskryfde spesies, *V. latebrosa*. *Vexatorella* word onderskei van *Leucospermum* deur die terminale bloeiwyses; of as 'n terminale pluim van twee tot ses gesteelde sentrifugerende opende hofies, of 'n enkele terminale gesteelde hofie. (*Leucospermum* het okselstandige hofies). Die genus is verwant aan *Leucospermum* maar vergelykbaar met *Leucadendron* daarin dat die blomskutblare vergroot en verhout in die nabevrugting stadium. Die blomme is wit of pienk, soet-gegeurd en daar word aangeneem, deur insekte bestuif.

Key words: *Vexatorella*, new genus, Proteaceae, terminal pedunculate capitula, south western Cape.

INTRODUCTION

The most recent generic treatment of the Proteaceae in southern Africa upholds thirteen native genera (Rourke, in Dyer, 1975). While the majority appear to be well-defined and easily recognisable, difficulties have been experienced in determining the most appropriate generic placing for certain

Accepted for publication 5th December, 1983.

taxa. This was especially evident in the case of the undescribed species discussed below. Consequently, I have found it necessary to review existing generic concepts and also erect an additional genus in order to arrive at a more natural classification of the southern African Proteaceae.

In January 1954, Miss E. E. Esterhuysen collected a small vegetative shoot and a few dry inflorescences (in the post-fruiting stage) of an unknown proteaceous species from the Langeberg, near Robertson in the southern Cape. Not only was the specimen obviously of an undescribed species (here newly described as *Vexatorella latebrosa* Rourke), but it could not be assigned to any known genus in the family. Further investigations had to be postponed due to a lack of adequate material. It was not until 1981, when the author and Miss Esterhuysen succeeded in re-locating a large population at Klaasvoogds near Robertson, that a careful morphological study could be undertaken and the species' systematic position evaluated. An examination of live flowering and fruiting material confirmed the initial view that it did not fit any existing generic concept in the Proteaceae. However, a clear affinity with two other taxa, until now unsatisfactorily placed in *Leucospermum* sect. *Xericola* as *L. alpinum* and *L. obtusatum*, was apparent. Their position in *Leucospermum* has always been dubious on account of their terminal rather than axillary capitula, but it was only with the discovery of the undescribed species from Robertson, that a clear picture of generic congruence between all these taxa emerged. A new genus *Vexatorella* Rourke, is described here to accommodate them.

DISTINGUISHING CHARACTERS OF *VEXATORELLA*

(1) *Inflorescence*

A major distinction between *Leucospermum* and *Vexatorella* is the position of the inflorescence; being axillary in *Leucospermum* but terminal in *Vexatorella*. The inflorescence in *Vexatorella latebrosa*, *V. obtusata* and *V. amoena* is invariably a single terminal pedunculate capitulum, but in *V. alpina* the inflorescence is frequently compound in the form of a terminal panicle of up to six pedunculate capitula, opening in basipetal (centrifugal) sequence (Fig. 1).

(2) *Leaves*

The leaves of *Leucospermum* are toothed at the apex when mature or if not when mature, then at least toothed in the juvenile stages. *Vexatorella* consistently produces linear-spathulate or obovate to spathulate-elliptic leaves with a single apical callus but no toothing, even in the juvenile stages.

(3) *Perianth*

In *Leucospermum* the three adaxial perianth segments are fused while

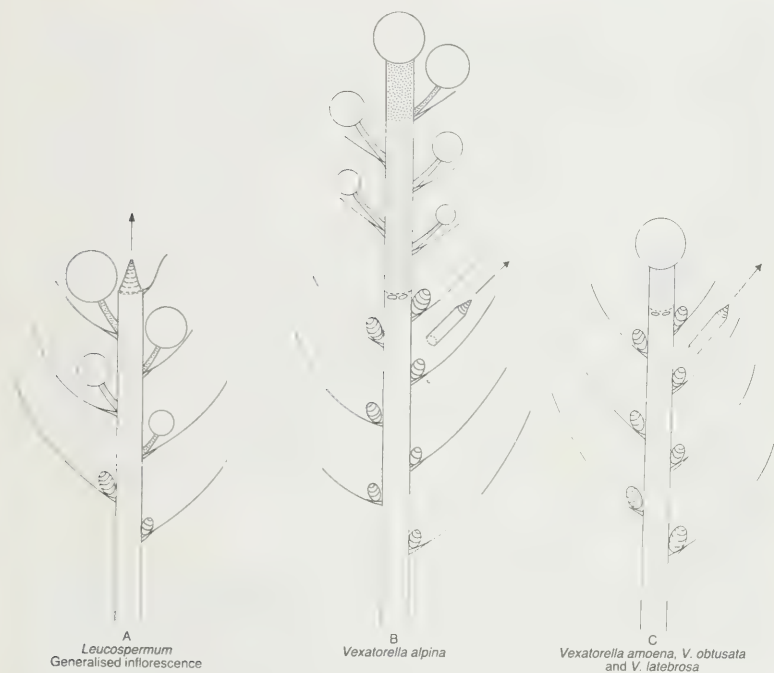


FIG. 1.

Diagrammatic representation of inflorescence structure in *Leucospermum* (A) which has pedunculate axillary capitula and *Vexatorella* (B & C) which have terminal pedunculate capitula, either compound as in *V. alpina* (B) or solitary as in *V. latebrosa*, *V. amoena* and *V. obtusata* (C). Peduncular tissue is stippled and the meristems initiating continued growth are marked with an arrow.

the abaxial perianth segment separates and remains free, except in the tube region. The perianth in *Vexatorella* opens symmetrically at anthesis with four free perianth segments separating equally, only being fused in the tube region.

(4) Floral bracts

Each floral bract subtending a pollinated flower in *Vexatorella* enlarges conspicuously and becomes lignified as the fruit matures within the capitulum. However, *Leucospermum* shows no such tendency, the floral bracts remaining soft and inconspicuous after the fruits have been released.

(5) Fruits

The fruits in *Leucospermum* and *Vexatorella* are small nut-like achenes, minutely puberulous to glabrous, with an adaxial suture. Fruits in *Vexatorella* are prominently beaked apically due to the persistent remnants of the style base but are tapered, obtuse and wrinkled basally. *Vexatorella* fruits are morphologically very similar to *Paranomus* fruits. By contrast, the fruits of *Leucospermum* lack an apical beak and are broadly emarginate at the base.

(6) Pollen

Palynological studies on southern African genera of the Proteaceae subtribe Proteinae (sensu Johnson & Briggs, 1975), indicate that pollen grains tend to be rather uniform, showing little significant generic differentiation (Erdtman, 1966; van Zinderen Bakker, 1953). Nevertheless, a routine S.E.M. investigation of pollen from all four *Vexatorella* species was undertaken. This revealed that the pollen is similar in morphology and sculpturing to other southern African genera of the subtribe, confirming the above views. The pollen grains are of medium size, $\pm 30\text{--}35$ microns in diameter, with the sculpturing a smoothish, irregularly knotted reticulum (Fig. 2). No taxonomically significant characters at generic level are observable in the pollen of the four species assigned to *Vexatorella*.

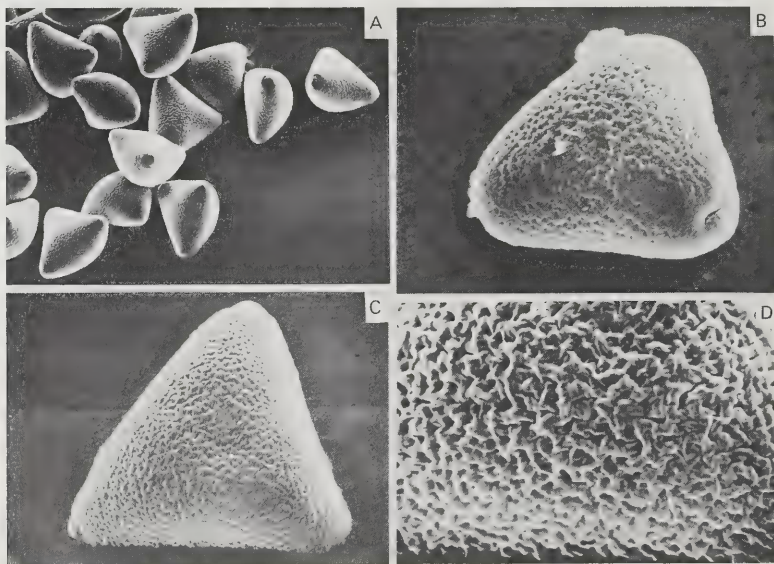


FIG. 2.

S.E.M. studies of *Vexatorella* pollen grains. (A) *V. latebrosa* (Rourke 1780). Horizontal field width 150 microns; (B) *V. alpina* (Rourke 1800). Horizontal field width 55 microns; (C) *V. latebrosa* (Rourke 1780). Horizontal field width 50 microns; (D) *V. latebrosa* (Rourke 1780). Horizontal field width 21 microns.

POLLINATION

Brief diurnal field observations on all four species have failed to yield any data on possible pollinators. However, several characteristics suggest insect pollination as being most probable. These are: the sweet very distinctive perfume peculiar to this genus which is emitted by the flowers on opening; the pale cream or pink coloured flowers; the absence of any style elongation at anthesis, as is typical of ornithophilous Proteaceae; and the rather small nectar volumes in each flower.

In particular, the pale flower colour in some species and the sweet perfume suggest nocturnal visits by moths as a likelihood.

RELATIONSHIPS AND DISTRIBUTION

As previously suggested (Rourke, 1983), the genera of the Proteaceae subtribe Proteinae can be arranged in a number of subsidiary groupings; *Leucospermum*, *Diastella*, *Mimetes* and *Orothamnus*, constituting one such clustering. Although *Vexatorella* is clearly associated with these genera and appears to be closely allied to *Leucospermum*, some of its characters (e.g. small-flowered terminal capitula with floral bracts becoming lignified in the post-pollination phase) suggest an affinity with *Leucadendron* (subtribe Aulacinae). This latter modification may foreshadow the development of the woody female cone in the dioecious *Leucadendron*. Within *Vexatorella* the most obvious evolutionary trends concern the inflorescence. *Vexatorella alpina*, in which the inflorescence is either a terminal panicle of up to six pedunculate capitula, opening in centrifugal succession or a single terminal pedunculate capitulum, probably represents the least specialised primitive condition; while *V. latebrosa*, *V. amoena* and *V. obtusata*, producing consistently solitary terminal pedunculate capitula, are most likely to represent a reduced, derived condition.

With respect to its distribution, *Vexatorella* is unlike other Cape-centred genera of the Proteaceae, all of which occur adjacent to the sea coast at some point in their ranges. *Vexatorella* however, is restricted to inland mountain ranges of the central south western Cape and Namaqualand (Fig. 3), thus occupying a marginal position in arid fynbos within a region of low winter rainfall, along the ecotone between the Cape and Karoo floras. This pronounced inland shift in its distribution range, as well as its markedly ecotonal habitat requirements, suggest that *Vexatorella* is perhaps relictual and may represent a remnant of an ancestral form from which the dioecious *Leucadendron* may also have been derived.

Vexatorella Rourke, gen nov.

Frutices erecti vel decumbentes. Folia alternata, lineari-spathulata vel late elliptica, obtusa, integra, callis solitariis apicalibus. Inflorescentia ter-

minalis; plerumque capitulum pedunculatum solitarium; interdum panicula 2–6 capitulorum pedunculorum centrifuge dehiscentia. *Flores* bisexuales, actinomorphae, perianthium quadripartim; segmentis quatuor, pariter secendentes per anthesin. *Stylus* rectus, non productens. *Stigma* clavatum. *Ovarium* obovoideum vel lageniforme, uniloculatum; ovulo uno. *Squamulae hypogynae* quatuor. *Fructus* achenium ovoideum, puberulum vel glabrum, rostellatum ad apicem, obtusem et caperatum basi, sutura adaxiali.

Typus: Vexatorella alpina (Salisb. ex Knight) Rourke

Erect or sprawling shrubs. *Leaves* alternate, linear-spathulate to spathulate-elliptic, obtuse, entire with a single apical callus. *Inflorescence* terminal; usually a solitary pedunculate capitulum, occasionally a panicle of two to six centrifugally opening pedunculate capitula. *Flowers* sweetly perfumed, pink or cream, bisexual, actinomorphic, the four perianth segments separating equally at anthesis. *Style* straight, puberulous or glabrous, not elongating at anthesis. *Pollen presenter* clavate. *Ovary* obovoid to lageniform, single-chambered with a single pendulous ovule. *Hypogynous scales* 4, free, subulate. *Fruit* an ovoid, puberulous to glabrous achene, beaked apically, obtuse and wrinkled basally, with an adaxial suture.

The generic name is a compound formed from *vexator*, a trouble-maker or tormentor, one who harasses or disturbs, and the diminutive suffix *-ella*; hence "the little trouble-maker", a name which alludes to the difficulties experienced in assessing its taxonomic status.



FIG. 3.

Distribution range of the genus *Vexatorella*. The genus is confined to inland mountains in the south western Cape and Namaqualand.

DISTRIBUTION

Vexatorella comprises four species occurring in mountainous areas of the central south western Cape and Namaqualand.

KEY TO THE SPECIES OF VEXATORELLA

1. Leaves linear-spathulate, 1,5–6,0 mm wide.
 2. Leaves 9–45 mm long **obtusatum**
 - 2'. Leaves 50–60 mm long **latebrosa**
- 1'. Leaves obovate to spathulate-elliptic, 5–13 mm wide.
 3. Inflorescence usually a panicle of 2–6 pedunculate capitula, occasionally a solitary pedunculate capitulum; leaves 30–45 mm long; confined to Kamiesberg **alpina**
 - 3'. Inflorescence a solitary capitulum; leaves 15–30 mm long, confined to Ceres, Cold Bokkeveld and Swarttruggens mountains **amoena**

(1) *Vexatorella alpina* (Salisb. ex Knight) Rourke, comb. nov.

Protea alpina Salisb. ex Knight, Cult. Prot.: 27 (1809). Lectotype. "On the high peak of Khamiesbergh", Niven 47 (PH); isolectotype in herb. J. E. Smith (LINN).

Leucospermum alpinum (Salisb. ex Knight) Rourke in Jl S. Afr. Bot. **33**: 266 (1967).

Leucospermum alpinum (Salisb. ex Knight) Rourke ssp. *alpinum*, Rourke in Jl S. Afr. Bot. Suppl. Vol. **8**: 144 (1972).

Leucadendron cartilagineum R. Br. in Trans. Linn. Soc. Lond. **10**: 67 (1810). Type: In Africa Australi without collector, in herb. Linn. Soc. et Herb. Hibbert:—not traced but clearly identifiable from description.

Protea cartilaginea (R. Br.) Poir. in Lam., Encycl. Meth. Bot. Suppl. **4**: 557 (1816).

Leucospermum cartilagineum (R. Br.) Phillips in Fl. Cap. **5**: 636 (1912).

A large, erect, spreading shrub 2–3 m in height, up to 4 m in diam. with a stout main trunk dividing near ground level into several main branches, up to 150 mm in diam. Bark smooth, grey. Flowering branches terete 3–4 mm in diam., initially covered with a fine crisped puberulous indumentum, soon glabrous. Leaves obovate to elliptic-spathulate, 30–45 mm long, 5–13 mm wide, ascending, entire, glabrous, glaucous; petioles up to 8 mm long, apex obtuse with a reddish-amber callus. Inflorescence either a terminal pedunculate panicle of up to 6 globose pedunculate capitula, the capitula opening in centripetal succession; or, more usually reduced to a single terminal pedunculate capitulum; peduncles 5–15 mm long, densely puberulous with one or two sterile linear bracts near base of main axis. Capitula 20–25 mm in diam. containing 15 to 30 flowers, lacking a surrounding involucre of sterile bracts. Receptacle ovoid to spherical 5–7 mm in diam. Floral bracts narrowly ovate



FIG. 4.

Vexatorella alpina. (1) Compound terminal inflorescence consisting of five pedunculate capitula; (2) reduced condition consisting of a solitary terminal capitulum; (3) longitudinal section through a single capitulum; (4) single flower; (5) floral bract; (6) gynoecium; (7) style apex and pollen presenter; (8) base of gynoecium showing hypogynous scales and the minutely puberulous base of the style. Drawn from Rourke 1800.

to broadly lanceolate, acute, 5–6 mm long, 2–3 mm wide at anthesis enlarging up to three times these dimensions and becoming woody in the fruiting stage. *Perianth* straight, 12–18 mm long, the four perianth segments separating equally at anthesis; outer surface puberulous with a dense crisped indumentum; tube 7–8 mm long, quadrangular, puberulous distally, glabrous proximally; claws bowed outwards above tube prior to opening; limbs narrowly elliptic to linear, cymbiform, scarcely differentiated from claws, 2–3 mm long, outer surface sparsely villous. *Style* straight, 12–18 mm long, terebate, dark carmine, usually glabrous but occasionally very sparsely puberulous proximally. *Pollen presenter* clavate, 1.5 mm long, stigmatic groove terminal. *Ovary* oblong-obovoid, 2 mm long, clearly differentiated from style, puberulous, unilocular, with a single pendulous ovule. *Hypogynous scales* linear-subulate, 1.5 mm long. *Fruit* an ovoid to obovoid, minutely puberulous achene, 6–8 mm long, 2.5–3 mm wide, prominently beaked apically, truncate and minutely pedicellate at base with an adaxial suture.

DIAGNOSTIC CHARACTERS

Vexatorella alpina is distinguished by its usually compound inflorescences, consisting of loose terminal panicles of up to six pedunculate capitula, opening in centrifugal sequence and by its obovate to elliptic-spathulate leaves, 30–45 mm long.

This is the largest species in the genus. Mature specimens develop into dense spreading shrubs 2–3 m in height and up to 4 m in diameter, with stout main trunks up to 150 mm in diameter, often branching almost at ground level. Previously, *V. alpina* and *V. amoena* were regarded as subspecies (Rourke, 1972) but in view of the significant differences in their inflorescence structure and growth habit, as well as their geographical isolation and different edaphic requirements, specific rank is here considered to be the most appropriate treatment of these taxa.

Vexatorella alpina is endemic to the Kamiesberg—the highest land surface in Namaqualand—where it occurs sporadically at elevations from 1 200 to 1 500 m between Welcome farm in the south and Leliefontein and Ezelkop at the northern extremities of its range. It is found exclusively on soil derived from Archaen granite, among large granite boulders or in open foothills often forming quite dense stands. This species is one of the larger, more prominent woody shrubs in the Kamiesberg range, even becoming locally dominant.

The inflorescences are cream-coloured and the flowers emit a strong sweetish odour on opening. Flowering takes place between September and December.



FIG. 5.

Vexatorella alpina. A flowering shoot terminated by a compound inflorescence. Note collar of bracts at base of main central peduncle. Life-size. (Rourke 1800).

SPECIMENS EXAMINED

CAPE PROVINCE—3018 (Kamiesberg): Leliefontein, Roodeberg, Ezelkop (-AC), Nov., *Drège s.n.* (M, NY, B, SAM, S, G, PRE, K, BM); Leliefontein, 4500 ft, 3/11/1830, *Drège s.n.* (P); Roodeberg, 4000–5000 ft, 10/11/1830, *Drège 2417* (P, B); Kamiesbergen, May, *Marloth 4865* (PRE); Leliefontein, Kamiesbergen, *Marloth 8758* (PRE); Ezelkop, near summit, Kamiesberg, Oct., *Adamson 1466* (CT, PRE); Kamiesberg, Feb. (in fruit), *George s.n.* (STE 19567); Beacon Hill, north of Leliefontein, Jan. (in fruit), *Pearson 6330* (BOL, SAM, K); Near Leliefontein, Sept., *Levy's 4003* (CT); Welcome, Kamiesberg, Oct., *Esterhuysen 23735* (BOL); "On the high peak of Khamiesbergh", *Niven 47* (PH, LINN, NBG); Kamiesberg range, eastern slopes 3 km north of Welcome Farm, Nov., *Rourke 1800* (NBG, PRE, K, MO).

(2) *Vexatorella amoena* (Rourke) Rourke, comb. nov. et stat nov.

Leucospermum alpinum (Salisb. ex Knight) Rourke ssp. *amoenum* Rourke in Jl S. Afr. Bot. Suppl. Vol. 8: 146 (1972). Type: Ceres district, at Katbakkies, Swarttruggens Range between Cold Bokkeveld and Ceres Karoo, *Rourke 958* (NBG, holotype; K, PRE, STE, MO, S, M, C, BOL, isotypes).

A small erect to suberect, occasionally sprawling, rather sparsely branched shrub, 1–1.5 m in height with a single main trunk 30–50 mm in diam. *Flowering branches* sparsely and minutely crisped, soon glabrous, 1.5–2.0 mm in diam. *Leaves* obovate to spatulate-elliptic, 15–30 mm long, 5–11 mm wide, entire, apex obtuse with a single thickened callus; petiolate to subpetiolate, glabrous, glaucous, coriaceous. *Inflorescence* a solitary globose, pedunculate capitulum, 15–25 mm in diam., with a small collar of lanceolate-acuminate bracts at the junction of the stem apex and base of



FIG. 6.
Distribution of *Vexatorella alpina*.

peduncle. *Capitula* containing 18–35 flowers, lacking a surrounding involucre of sterile bracts. *Receptacle* ovoid, 4–5 mm in diam. *Floral bracts* lanceolate-acuminate, 8–10 mm long, densely lanate, enlarging and becoming woody in post-pollination phase. *Perianth* 12–18 mm long, straight, outer surface densely villous, tube quadrangular, glabrous, 2–3 mm long; claws opening equally at anthesis; limbs lanceolate-cymbiform, 2 mm long, densely tomentose. *Style* terete, straight, 14–16 mm long, very sparsely puberulous, dark carmine. *Pollen presenter* clavate, 2 mm long. *Ovary* oblong, 1 mm long, puberulous. *Hypogynous scales* subulate-filiform, 2 mm long. *Fruit* an ovoid, puberulous to glabrous achene 6 mm long, 4 mm wide.

DIAGNOSTIC CHARACTERS

Vexatorella amoena is distinguished from *V. alpina* by its solitary capitula, its short (15–30 mm long), obovate to spatulate-elliptic leaves and its sparse, lax, often semi-erect growth habit.

Although previously treated as a subspecies of *V. alpina* (Rourke, 1972), consistent differences in inflorescence morphology and growth habit, as well as in leaf dimensions, suggest that specific rank is more appropriate. A sparse, open, often semi-erect growth habit to a maximum of 1.5 m in height and spread is characteristic of *V. amoena*, whereas *V. alpina* is a dense robust shrub to 3 m in height with a spread of up to 4 m.

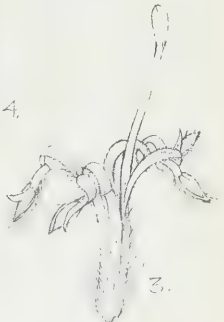
Vexatorella amoena is confined to the south eastern Cold Bokkeveld and adjacent Swartruggens mountains in the central south western Cape. It is essentially a species of mountainous terrain occurring at elevations between 1 000 and 1 500 m, in arid fynbos, exclusively on Table Mountain Sandstone formations. Flowering takes place between September and November. The sweetly scented flowers are pink to pale carmine.

SPECIMENS EXAMINED

CAPE PROVINCE—3219 (Wuppertal): Road to Ceres Karoo beyond Houdenberg, Cold Bokkeveld (-CD), Sept., *Williams 891* (NBG); Kleinveld farm, south of Bloukop, Skurweberge Range, Oct., *Rourke 1499* (NBG); Katbakkies, Swartruggens Range between Cold Bokkeveld and Ceres Karoo (-DC), Oct., *Rourke 958* (NBG, K, PRE, STE, MO, S, M, C, BOL). —3319 (Worcester): Gydo, Ceres (-AB), Nov., *Compton 18712* (NBG); Ertjesland Kloof, near Sandberg, South Cold Bokkeveld, Oct., *Esterhuysen 3449* (BOL, PRE, K); South Cold Bokkeveld, Oct., *Bond 647* (NBG); Baviaansberg (-BA), Jan., *Stokoe 4547* (BOL); Baviaansberg, Nov., *Esterhuysen 29842* (NBG); Dwarsberg, Ceres, Cold Bokkeveld, Sept., *Levyns 1942* (CT, K).

FIG. 7.

Vexatorella latebrosa. (1) Flowering shoots; (2) longitudinal section through terminal capitulum; (3) single flower; (4) perianth limb; (5) gynoeceum, showing clavate pollen presenter; (6) flower in bud, immediately before opening; (7) floral bract; (8 & 9) fruits showing abaxial view; (8) and adaxial view (9). Drawn from the type material, *Rourke 1780*.



1885

- (3) **Vexatorella latebrosa** Rourke, species nova; species erecta ramosissima, foliis linearibus-spathulatis integris, 50–60 mm longis, distinguenda.

Frutex erectus, 1–2 m altus, ramosissimus; truncus 20–35 mm in diam. *Folia* ascendentia, lineari-spathulata, 50–65 mm longa, 2–3 mm lata, obtusa, integra, supra late canaliculata, villosa ab initio, postea glabra. *Capitulum* terminale, globosum, pedunculatum, 25–30 mm in diam., floribus 40–50. *Bractae involucales* laxae 2–3 seriatæ, lanceolato-acuminatæ, 8–10 mm longæ, 2–3 mm latæ, dense villosæ. *Perianthium* 15–18 mm longum, rectum, actinomorphy, dense villosum; tubus quadrangulus, glaber, 3–4 mm longus. *Stylus* 15–18 mm longus, rectus, glaber. *Stigma* clavatum, 2 mm longum. *Ovarium* oblongo-lageniforme, 3 mm longum, puberulum.

Typus:—3320 (Montagu): Bergendal Farm, Klaasvoogds, near Robertson on S W slopes of Langeberg on a ridge between Tweevelrkbos and Middelrug (-CC), 1/9/1982, J. P. Rourke 1780 (NBG, holotype; PRE, K, BOL, S, MO, NSW, E, G, STE, isotypes).

An erect shrub 1–2 m in height with a single straight main trunk 20–35 mm in diam., usually branching at about 450 mm to form a rounded, divaricate crown up to 1 m in diam. *Flowering branches* 2–5 mm in diam., initially villous with short crisped trichomes interspersed, later glabrous. *Leaves* spreading to loosely ascending, entire, linear-spathulate, 50–65 mm long, 2–3 mm wide tapering in petiolar region, upper surface concave to broadly channelled, apex obtuse with a single reddish callus; surface densely villous to puberulous at first, glabrous when mature. *Inflorescence* a solitary terminal globose capitulum 25–30 mm in diam., sessile to shortly pedunculate, peduncle to 10 mm long; capitulum usually consisting of 40–50 flowers. *Receptacle* depressed-ovoid 6–8 mm in diam. *Involucral bracts* loosely 2–3-seriate, lanceolate-acuminate, 8–10 mm long, 2–3 mm broad at base, very densely villous. *Perianth* 15–18 mm long, straight in bud, actinomorphic; tube quadrangular, glabrous, 3–4 mm long; claws slender becoming coiled distally after anthesis, densely villous, carmine in live state; limbs very narrowly lanceolate-cymbiform, acute, 3 mm long, densely villous-hirsute. *Anthers* sessile, narrowly lanceolate-linear, connective prolonged into a distinct black apical boss. *Floral bracts* oblanceolate, acute to acuminate, tightly clasping perianth, 6–8 mm long, 2–3 mm wide, very densely lanate except at apex, enlarging and becoming woody if subtending a developing fruit. *Style* 15–18 mm long, straight, not elongating at anthesis, glabrous, with a prominent swelling at base; carmine in live state. *Pollen presenter* prominently clavate, 2 mm long, slightly annulate at junction with style, stigmatic groove terminal. *Ovary* oblong-lageniform, 3 mm long, puberulous. *Hypogynous scales* filiform-subulate, hyaline, 2 mm long, *Fruit*

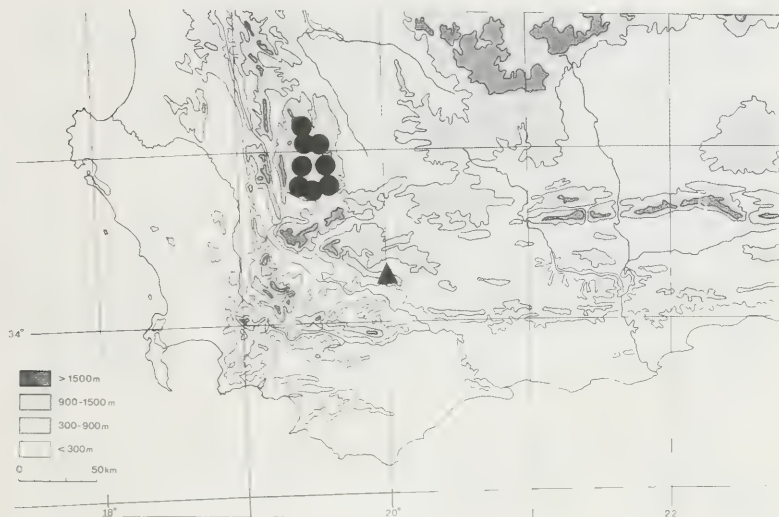


FIG. 8.

Distribution ranges of *Vexatorella amoena* (solid circles) and *V. latebrosa* (solid triangle).

an oval, minutely puberulous to glabrous achene, 8–10 mm long, 4 mm wide, beaked at stylar end, obtuse and wrinkled at base.

DIAGNOSTIC CHARACTERS

This species is readily distinguished by its linear-spathulate leaves, 50–65 mm long and conspicuously villous to puberulous at first, though later glabrescent.

Vexatorella latebrosa is a very localised endemic confined to middle slopes of the Langeberg near Klaasvoogds in the Robertson area of the south western Cape. Thus far, it is only known from a few populations dispersed over an area of several square kilometres, at elevations between 400 and 900 m. Although locally common, no records have been made outside this highly restricted distribution area. A steep south west-facing aspect is favoured on heavy reddish clay soils derived from Malmesbury shale. Most populations of this species occur in low fynbos or on the ecotone between mountain renosterbosveld and fynbos. At maturity *V. latebrosa* is a densely

branched, rounded shrub, 1–2 m in height with a single main trunk up to 35 mm in diameter. This species is not fire-resistant. Regeneration after burning is by seed.

Flowering takes place in August and September, with the fruits ripening and dehiscing during late October and early November. The flowers are pink to carmine and sweetly scented.

SPECIMENS EXAMINED

CAPE PROVINCE—3319 (Worcester): South slopes of Langeberg at Klaasvoogds (-DD), 31/1/1954, *Esterhuysen* 22702 (BOL).

—3320 (Montagu): South west slopes of the Langeberg, above Klaasvoogds west, on a ridge between Tweevlerkbos and Middelrug (-CC), 20/10/1981, *Rourke* 1749 (NBG); Bergendal Farm, Klaasvoogds, near Robertson on south west slopes of Langeberg, 1/9/1982, *Rourke* 1780 (NBG, K, PRE, BOL, STE, S, MO, NSW, G, E); Bergendal farm above Klaasvoogds, 1/11/1983 (in fruit), *Rourke* 1808 (NBG, PRE, K, MO, S).

(4) *Vexatorella obtusata* (Thunb.) Rourke, comb. nov.

Protea obtusata Thunb. in *Phytopogr. Blätt* 1: 15 (1803). Type: Cap. b. spei, Thunberg s.n., sheet No. 2946 in herb. Thunberg (holotype, UPS!)—Basionym.

An erect to suberect sprawling shrub 200 mm–1,0 m in height, 1,0–2,0 m in diam. *Flowering stems* erect or trailing, 1,0–2,0 mm in diam., thinly puberulous with fine crisped hairs, soon glabrous. *Leaves* linear-spathulate, entire, 9–45 mm long, 1,5–6,0 mm wide, apex rounded, obtuse. Leaves dull grey-glaucous, puberulous at first becoming glabrous; stiffly erect-ascending or secund. *Inflorescences* terminal, globose, 15–20 mm in diam. *Involucral receptacle* depressed globose, 30–40 mm in diam. *Involucral bracts* ovate, 60–80 mm long, 20–40 mm broad, outer surface thickly tomentose to lanate; bracts imbricate, cartilaginous, uniseriate. *Floral bracts* ovate-acute, 50–70 mm long, 25–30 mm wide, thickly lanate, tightly clasping the perianth. *Perianth* 10–15 mm long, straight, the four perianth claws becoming equally recurved at anthesis; cream or pink in fresh state. *Perianth tube* 2–3 mm long, slightly quadrangular, glabrous. *Perianth claws* filiform, the outer surface beset with a fine crisped indumentum. *Perianth limbs* lanceolate-acute, 3 mm long, outer surface very shortly villous. *Anthers* sessile, elliptic, 2,5 mm long, apical boss pointed, black. *Style* 10–13 mm long, straight, pale yellowish-green at first becoming deep claret-coloured with age. *Pollen presenter* clavate-obtuse, 1,5–2,0 mm long, greenish when fresh, becoming amber with age. Stigmatic pore terminal, minute. *Ovary* ovoid, 10 mm long, very clearly differentiated from style; pubescent. *Hypogynous scales* subulate, hyaline, 1 mm long. *Fruit* an ovoid, puberulous to glabrous achene, 5–6 mm long, 4 mm wide.

DIAGNOSTIC CHARACTERS

The entire linear-spathulate leaves, 9–45 mm long, attenuate to petiolate at the base, distinguish *V. obtusata* from all other species in the genus.

KEY TO THE SUBSPECIES

Stems decumbent or trailing, leaves secund, 10–25 mm long. ssp. ***obtusata***
 Stems erect, leaves loosely ascending imbricate, 22–45 mm long. ssp. ***albomontana***

(a) subsp. ***obtusata***

Protea obtusata Thunb. in Phytogr. Blätt. 1: 15 (1803). Type: Cap. b. spei, *Thunberg s.n.*, sheet no. 2946 in herb. Thunberg (holotype, UPS).

Protea obtusa Thunb. in Nova Acta Acad. Sci. Imp. Petrop. Hist. Acad. 15: 461, tab. 3 fig. 2 (1806). Type: As for *P. obtusata*.

Leucadendron ? obtusatum (Thunb.) Meisn. in DC., Prodr. 14: 227 (1856).

Leucospermum obtusatum (Thunb.) Phillips in Fl. Cap. 5: 637 (1912); Rourke in Jl S. Afr. Bot. Suppl. Vol. 8: 146 (1972).

A sprawling decumbent shrub with stems trailing along the ground; forming dense mats, 1.0–2.0 m in diam. *Leaves* secund to subsecund, linear-spathulate, 10–25 mm long 0.5–4.5 mm wide.

Vexatorella obtusata subsp. *obtusata* occurs mainly in the Waboomsberg and Koo mountains in the Montagu district at the southern end of its range, extending westwards to Keeromsberg (Worcester), with northerly outliers on Matroosberg and at Bokkeriver near Ceres.

This prostrate subspecies occurs in arid fynbos on soils derived from Table Mountain Sandstone, generally at elevations between 300 and 1 800 m. Mature specimens develop into dense spreading mats up to 200 mm in height and 2 m in diameter, with numerous branches radiating from a stout main trunk and trailing over the ground. The sweetly scented cream or pink inflorescences are produced from September to December, usually on young shoots at the perimeter of the shrub.

SPECIMENS EXAMINED

CAPE PROVINCE—3319 (Worcester): Matroosberg (-BC), *K. L. Davidson* 15 (K), and 37 (SAM); Bokkeriver-Farms (-BD), Nov., *Horrocks* 127 (NBG); Keeromsberg, S W side (-DA), Nov., *Esterhuysen* 9286 (BOL); Keeromsberg, Koo Valley side (-DB), *Esterhuysen* 22895 (BOL); Rooihoogete Pass, Oct., *Dahlgren & Strid* 3478 (NBG); Top of pass between Concordia and Eendracht, Oct., *Michell* 305 (PRE, CT); Concordia and Triangle, Oct., *Barnard* 683 (SAM). —3320 (Montagu): Waboomsberg at Brakkefontein (-CA), Oct., *Rourke* 1163 (NBG); Waboomsberg at Highlands, Oct., *Rourke* 1164 (NBG); Waboomsbergen, Eendracht (-CB), Sept., *Compton* 18388 (NBG, BOL); Eendracht, Sept., *Lewis* 1645 (SAM).



FIG. 9.

Distribution range of *Vexatorella obtusata*; subsp. *obtusata* (solid circles) and subsp. *albomontana* (solid triangle).

(b) subsp. *albomontana* (Rourke) Rourke, comb. nov. et stat. nov.

Leucospermum obtusatum (Thunb.) Phillips subsp. *albomontanum* Rourke in Jl S. Afr. Bot. Supp. Vol. 8: 148 (1972). Type: Summit of Witteberg at Bantams, Rourke 1161 (NBG, holotype; K, PRE, STE, MO, S, M, C, B, BOL, isotypes)—Basionym.

An erect to spreading shrub 0,5–1 m in height with a single main trunk. *Flowering branches* erect with leaves loosely ascending-imbricate. *Leaves* linear-spathulate, glabrous, glaucous, 22–45 mm long, 2,5–5,5 mm wide.

Vexatorella obtusata subsp. *albomontana* is distributed along the entire length of the Witteberg and adjacent Bonteberg at the western end of its range, extending eastwards to the Matjiesgoed mountains with the most easterly populations on the eastern end of the Anysberg, near Ladismith.

Throughout its range this subspecies grows exclusively on Witteberg quartzite, in contrast to the typical subspecies which is confined to Table Mountain Sandstone.

It is readily distinguished by its erect, upright growth habit. *Vexatorella obtusata* subsp. *albomontana* grows in arid fynbos usually in association with other dwarf proteaceous species. The inflorescences are pink to carmine coloured, sweetly scented, and are produced between August and November.

SPECIMENS EXAMINED

CAPE PROVINCE—3319 (Worcester): Eikenbosch Hoek, Bonteberg (-BD), Nov., *Esterhuysen 3700* (BOL, K, PRE).
—3320 (Montagu): Bonteberg (-AA), Nov., *Compton 9924* (NBG); Witteberg near Matjiesfontein (-BC), Nov., *J. D. Logan s.n.* No. 1155 in herb. Marloth (PRE); Witteberg near Whitehill, Nov., *L. E. Taylor 1248* (BOL); Tweedside, Witteberg Ridge, *Compton 3265* (BOL, BM, NBG, K); Summit of Witteberg at Bantams, Oct., *Rourke 1161* (NBG); Matjiesgoed mountains on the farm Klein Spreeufontein, Sept., *Vlok 439* (SAAS); East of Anysberg (-DA), Oct., *van Wyk 1000* (NBG, STE); Anysberg, eastern end of forestry track, Nov., *Vlok 763* (NBG).

ACKNOWLEDGEMENTS

I am much indebted to Miss Elsie Esterhuysen, of the Bolus Herbarium, for her time and patience in helping me re-locate populations of *Vexatorella latebrosa* on the Langeberg. All specimens cited in this paper, including types, have been examined personally. In this connection, curators of various herbaria, whose material is quoted here, are gratefully thanked for making this material available to me. Sincere thanks are also due to the artists Mrs. J. Loedolff (Figs 1 & 4) and Mrs. E. Ward-Hilhorst (Fig. 7) for their invaluable contributions. I would also like to thank Mr. E. G. H. Oliver for critically reading and commenting on the manuscript.

REFERENCES

- DEACON, H. J., 1983. Another look at the Pleistocene climate of South Africa. *S. Afr. J. Sci.* **79** (8): 325–328.
- DEACON, H. J., *et al.* (eds.), 1983. Fynbos palaeoecology: A preliminary synthesis. *S.A. National Scientific Programmes. Report No. 70*: 1–216.
- DYER, R. A., 1975. *The Genera of Southern African Flowering Plants*. Vol. 1: 40–47. Pretoria: Govt. Printer.
- DYER, W. T. (ed.), 1912. *Flora Capensis* 5 (1): 502–722. London: Lovell Reeve.
- ERDTMAN, G., 1966. *Pollen Morphology and Plant Taxonomy*. 1–553. New York: Hafner.
- JOHNSON, L. A. S. and BRIGGS, B. G., 1975. On the Proteaceae—the evolution and classification of a southern family. *J. Linn Soc. Bot.* **70** (2): 83–183.
- ROURKE, J. P., 1972. Taxonomic Studies on *Leucospermum* R. Br. *Jl S. Afr. Bot. Suppl.* Vol. **8**: 1–194.
- ROURKE, J. P., 1984. A revision of the genus *Mimetes* Salisb. *Jl S. Afr. Bot.* **50**: 172–237.
- VAN ZINDEREN BAKKER, E. M., 1953. *South African Pollen Grains and Spores*. Part 1: 1–88. Cape Town: A. A. Balkema.